

## **THE FUEGO SYSTEM: A SPACE-BASED INFORMATION SOURCE FOR AN EFFICIENT FIREFIGHTING**

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### **ABSTRACT**

FUEGO is the space-based system for early wildfire detection and monitoring. The system is composed of a constellation of small satellites equipped with infrared detectors and a decentralized ground user segment. The system is developed in an operational basis following a design-to-cost approach.

The FUEGO system achieves an excellent re-observation time over the areas of interest by taking advantage of the known distribution of the risk areas (co-called Area Of Surveillance, AOS) and the across-track depointing mirrors installed in the payloads, which make every satellite observe the whole AOS included in its area of regard. For a 40-deg latitude site, each satellite provides 5 or 6 useful passes per day; should 12 satellites be operative, a 21-min re-observation average time is reached. The satellites are allowed to perform pitch maneuvers to enhance the observation coverage.

This paper provides a description of the system from the operative point of view, showing the benefits of the very frequent infrared data when integrated with:

- Space and ground-based data
- Dedicated fire detection algorithms
- GIS

The Area Of Surveillance (AOS) is generated and validated by the final user and transferred to a central ground station through public networks. Once the satellites are programmed, the data is downlinked directly to small antennas at the user premises, where a quick process is performed to obtain the main data product: the location and intensity of the fires within the AOS.

The evolution of the concept, which payload prototype is currently being manufactured by a European consortium, is continuously supervised by the final users through a User Committee, two User Conferences and several demonstrations in specific extreme risk areas. As a result of this, a synergetic approach with the current data sources and management programs has been always taken. The better use of fire management tools when provided with FUEGO fresh information will result in less burning, better economy and less risk for personnel.

The FUEGO system shall provide a reliable firefighting tool for early fire detection and wildfire behavior monitoring affordable to the current budgets in the world temperate forests. FUEGO is expected to contribute to the global burned surface reduction in a safe and economical way.